CLAIMS

1. A method for the FOV dependent LOS scanning in a turret aided continuous zoom camera with the constant f-number (f/D) where one can change the field of view (FOV) continuously, wherein

the scan width is dependent on the FOV via the relation below:

$$W_S = \pm(m \times FOV)$$

(W_s is the scan width and m is the observation width constant)

the mean rate of LOS scanning for half period is determined as a function of the FOV via the following relation:

$$\Omega_S = \frac{C_0}{t_e} \cdot \tan(\frac{FOV}{2}) \sim \frac{C_1}{t_e} \cdot FOV$$

(Ω_s and t_e are respectively the scan rate and the eye integration time. The C_0 and C_1 are proportional constants)

whereby on the basis of the two equations above the FOV dependent LOS scan mechanism is expressed as follows:

$$\begin{Bmatrix} \Theta_{SCAZ}(AZ_{LOS}) \\ \Theta_{SCEL}(EL_{LOS}) \end{Bmatrix} = \begin{Bmatrix} (m \cdot FOV)\sin[\frac{\tan(\frac{FOV}{2})}{n(t_e) \cdot m \cdot FOV} t] + AZ_{LOS} \\ EL_{LOS} \end{Bmatrix}$$

(Θ_{SCAZ} and Θ_{SCEL} are respectively the azimuth and elevation angles of LOS vector. The AZ_{LOS} and EL_{LOS} are the initial reference position of LOS in the

azimuth and elevation angles. Meanwhile, the $n(t_e)$ is expressed as C'/ t_e with constant C')

2. The method according to claim 1 wherein the m ranges from 2.0 to 4.0 so that the operator can adjust the sensitivity of the scan width to the FOV by selecting one in that range.

3. The method according to claim 1 wherein the t_e ranges from 0.06 to 0.11 so that the operator can adjust the sensitivity of scan rate to FOV by selecting one in that range.

4. The method according to claim 1 wherein the scan period of the camera LOS is almost constant independently on the FOV.

5. An apparatus for the FOV dependent LOS scanning in a continuous zoom camera system consisting of:

a turret sensor module unit (TSU) including a sensor with the variable zoom optics, the mechanical structures and a stabilization driver;

a multifunctional display unit (MFDU) displaying the image and symbology;

a multifunctional control unit (MFCU) interfacing a camera system with an operator;

a system electronics unit (SEU) including a system control processor

(SCP), a digital servo controller (DSC), a video interface board (VIF) and a power modules (PWR) wherein the SCP is connected to the other modules, receiving and transmitting all the data in-between the constituent modules and governing the whole camera system, the DSC controls the LOS with the FOV data commanded from the MFCU via the SCP, the VIF generates the symbology related to the sensor data and the PWR supplies all the modules with power;

wherein the SCP and DSC include a memory storing the program for the scan process algorithm to determine the scan condition according to the following relations:

scan width = $f_1(m, FOV)$; monotonous function of FOV with parameter m

scan rate = $f_2(t_e, FOV)$; monotonous function of FOV with parameter t_e,

(m is the observation width constant and t_e the eye integration time)

and a calibration process is also programmed in the same memory allowing the operator to select the FOV sensitivity of the scan condition proper to himself by changing the parameters.

6. The apparatus according to claim 5 wherein the scan width is proportional to the FOV selected by the operator via the following equation:

$$W_S = \pm(m \times FOV)$$

(W_s is the scan width and m is the observation range constant)

7. The apparatus according to claim 6 wherein the m ranges from

2.0 to 4.0 so that the operator can adjust the sensitivity of the scan width to the FOV by selecting one in that range.

8. The apparatus according to claim 5 wherein the scan rate is almost linear to the FOV selected by the operator via the following relation:

$$\Omega_S = \frac{C_0}{t_e} \cdot \tan\left(\frac{FOV}{2}\right) \sim \frac{C_1}{t_e} \cdot FOV$$

(Ω_s and t_e are respectively the scan rate and the eye integration time. The C_0 and C_1 are proportional constants)

9. The apparatus according to claim 8 wherein the t_e ranges from 0.06 to 0.11 so that the operator can adjust the sensitivity of scan rate to FOV by selecting one in that range.

10. The apparatus according to claim 5 wherein the apparatus is applied to a turret aided zoom camera that is characterized by the IR (infrared) light or visible light detection.